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10/715,675	11/18/2003	Hiroki Taoka	82478-2300	4812

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SNELL & WILMER LLP (OC)
600 ANTON BOULEVARD
SUITE 1400
COSTA MESA, CA 92626

EXAMINER	
HAJNIK, DANIEL F	

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/715,675	TAOKA ET AL.	
	Examiner	Art Unit	
	Daniel F. Hajnik	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/28/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/28/2007 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey et al. (US Patent 6738526) in view of Hill et al. (US Patent 6577291).

As per claim 1, Betrisey teaches the claimed:

1. A display apparatus for displaying an image on a display device *(col 10, line 61, "Liquid crystal display device")* which includes rows of pixels *(col 8, line 39, "rows R(N), R(N+1), R(N+2)" and the rows shown in figure 6)*, each pixel composed of three sub-pixels that align in a lengthwise direction *(col 8, lines 52-54, "each one of the source image segments 622, 623, 624 is over-sampled in the direction perpendicular to the RCB striping" where over-sampling can*

create sub-pixels and the sub-pixels are also shown in figure 6) of the pixel rows and emit light of three primary colors respectively *(col 13, lines 53-54, "the R, G, and B pixel sub-component luminous intensity values")*, the display apparatus comprising:

a front image storage unit operable to store color values of sub-pixels that constitute a front image to be displayed on the display device *(col 12, lines 9-10, "Portions of a character within a character outline represent foreground image areas" and col 13, line 9, "foreground ... color selections" and col 13, lines 22-23, "display buffer 825")*;

a superimposing unit *(col 26, line 50, "the color blending step 2304")* operable to generate, from color values of the front image stored in the front image storage unit and color values of an image currently displayed on the display device, color values of sub-pixels constituting a composite image of the front image and the currently displayed image *(col 27, lines 59-64, "The term compositing is used to refer to a color blending operation which involves the use of a background image to supply the background color luminous intensity values used in the blending operation. In step 2404, foreground and background colors are applied")*;

a displaying unit *(col 10, line 61, "Liquid crystal display device 754")* operable to display the composite image based on the color values thereof after the smoothing out *(col 28, lines 23-25, "The gamma corrected RGB luminous intensity values are stored in the display buffer 1314 for use in controlling the display device to display the intended character images")*.

Betrisey does not explicitly teach the remaining claim limitations:

Hill suggests the claimed:

a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows *(col 19, lines 44-46, "A red/green difference intensity value is determined and compared to a threshold value")*, from color values of first-target-range sub-pixels *(figure 9C, step 976 where the threshold can indicate a target range and figure 9D, step 993)* composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit *(where figure 7B shows the Red and Green color components adjacently located)*;

Hill teaches the claimed:

a filtering unit operable to smooth out color values of second-target-range subpixels of the composite image that correspond to the first-target-range sub-pixels *(col 19, lines 4-10, "adjusting the luminous intensity of pixel sub-components of distracting pixels may involve (1) subtracting some luminous intensity from bright pixel sub-components and/or (2) adding some luminous intensity, e.g., the amount that was subtracted in (1), to an adjacent, different colored pixel sub-component, e.g., a neighboring pixel sub-component of the same pixel" where adjusting the luminance is filtering)*, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target range sub-pixels *(col 17, lines 61-65, "weighted scaling technique discussed above, the first three segments of each pixel area of the scaled image are used to determine the luminous intensity value of a red pixel sub-component corresponding*

to a pixel in the bitmap image" and where the filtered pixels color are in an acceptable second-target range, also see figure 9D, step 995);

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey and Hill, because Betrisey and Hill are analogous art. Further, Hill teaches one advantage of the combination by teaching of "Performing steps (1) and/or (2) in accordance with the color compensation techniques of the present invention reduces color artifacts and thus color distractions" (col 19, lines 10-13), where Betrisey can benefit from the added functionality.

As per claim 2, Betrisey does not teach the claimed limitations.

Hill suggests the claimed:

2. The display apparatus of Claim 1, wherein the calculation unit calculates a temporary dissimilarity level for each combination of the first-target-range sub-pixels, from color values of the first-target-range subpixels, and regards a largest temporary dissimilarity level among results of the calculation to be the dissimilarity level *(where in figure 9C, a loop is shown where different comparisons of each red green pixels for each row can be tested)*.

One advantage to particularly using the claimed maximum value would be to quickly focus on smoothing the largest intensity dissimilarities.

As per claim 3, Betrisey does not explicitly teach the claimed limitations.

Hill teaches the claimed:

3. The display apparatus of Claim 2, wherein

the first-target-range sub-pixels and the second-target-range sub-pixels are identical with each other in number and positions in the display device *(in figure 7B where the layout of sub-pixels or pixels is shown, further figure 9D indicates the first-target-range sub pixels in step 993 where a threshold is tested, and if filtering is required, figure 9D also indicated the second-target-range sub pixels in step 995 where the sub-pixels or pixels are adjusted to an acceptable range where these adjusted pixels are in the same located in the grid as shown in figure 7B).*

One advantage to using the claimed feature is that this correspondence is number and location makes intuitive sense and makes for straightforward filter implementation.

As per claim 4, Betrisey does not teach the claimed limitations.

Hill teaches the claimed:

4. The display apparatus of Claim 1, wherein

the filtering unit performs the smoothing out of the second-target-range sub-pixels if the dissimilarity level calculated by the calculation unit is greater than a predetermined threshold value, and does not perform the smoothing out if the calculated dissimilarity level is no greater than the predetermined threshold value *(col 19, lines 44-46, "A red/green difference intensity value is determined and compared to a threshold value", also see figure 9C, step 976).*

It would have been obvious to one of ordinary skill in the art to combine this teaching of Hill with Betrisey. The motivation of claim 1 is incorporated herein.

As per claim 9, this claim is similar in scope to claim 1, and is rejected under the same rationale.

As per claim 11, the reasons and rationale for the rejection of claim 1 is incorporated herein. Betrisey teaches the claimed "computer-readable recording medium" *(col 10, lines 8-10, "The personal computer 720 may include ... a system memory 722").*

Claims 5-8, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey et al. (US Patent 6738526) in view of Hill et al. (US Patent 6577291) in further view of McCormack et al. (US Pub 2002/0097241).

As per claim 5, the reasons and rationale for the rejection of claim 1 is incorporated herein. Betrisey does not explicitly teach the remaining claim limitation relating to calculating the dissimilarity level using transparency values.

McCormack teaches the claimed:

a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, from (i) color values and (ii) transparency values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit; *([0267], "A number of methods for comparing colors are possible, of which possibly the simplest is to compute for the red, green, blue, and alpha (RGBA) components of color the absolute value of the difference between the value for one fragment and the value for the other fragment").*

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey, Hill, and McCormack in order to achieve more accurate color differences between regular colors and colors using a transparency component as well. This ability to handle

transparency colors with dissimilarity calculations makes the system more flexible to use with a wider variety of color pixels and formatting.

As per claims 6-8, these claims are similar in scope to claims 2-4, respectively, and are rejected under the same rationale.

As per claim 10, this claim is similar in scope to claims 1 and 5, respectively, and is rejected under the same rationale.

As per claim 12, the reasons and rationale for the rejection of claims 1 and 5 are incorporated herein. Betrisey teaches the claimed "computer-readable recording medium" *(col 10, lines 8-10, "The personal computer 720 may include ... a system memory 722").*

3. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey in view of Hill in further view of Ohta et al. (US Pub 2003/0090494).

As per claim 13, the reasons and rationale for the rejection of claim 1 is incorporated herein. Betrisey does not explicitly teach the claimed:
Ohta teaches the claimed:

a second sub-pixel emitting the same primary color as the target sub-pixel with a second color value associated with it, wherein the second sub-pixel is adjacent to the target subpixel in the lengthwise direction of the pixel rows in the front image *(paragraph [0047], "two pixels*

horizontally adjacent to the target pixel" where one of these two adjacent pixels can be a second sub-pixel and [0047], "the process is carried out for each R, G, and B, separately" thus the two adjacent pixels for a given comparison in the process will have the same primary color because each is processed separately);

a calculation unit operable to calculate a dissimilarity level of the target sub-pixel and at least one second sub-pixel using the first color value and the second color value *([0047], "to calculate a difference v in color information between two pixels vertically adjacent to the target pixel and a difference h in color information between two pixels horizontally adjacent to the target pixel (step S203). At this time, when the color information of each pixel is represented by the RGB system, difference calculation is made for each of these R, G, and B, separately")*;

a third sub-pixel emitting the same primary color as the target sub-pixel with a third color value associated with it, wherein the third sub-pixel is located in the composite image and the third sub-pixel corresponds in location with the target sub-pixel *(paragraph [0047], "two pixels horizontally adjacent to the target pixel" where one of these two adjacent pixels can be a third sub-pixel and [0047], "the process is carried out for each R, G, and B, separately" thus the two adjacent pixels for a given step in the process will have the same primary color because each is processed separately)*;

a filtering unit operable to smooth out the color value of the third sub-pixel, by assigning a weight to the color value of the third sub-pixel, wherein the weight is determined in accordance

with the dissimilarity level *(abstract, "The, for every pixel, the original image and a blurred original image are blended according to the corner's degree" and [0047], "Each difference is calculated based on values of the color information on a scale from 0 (minimum) to 1 (maximum)" where these value can be a weight associated with the color difference level)*;

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey, Hill, and Ohta, because Betrisey, Hill, and Ohta are analogous art. Further, Ohta teaches one advantage of the combination by teaching of "an image processing apparatus capable of generating a clear image not having conspicuous jaggies without requiring a large memory capacity or imposing a large processing load" ([0010]).

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey in view of Hill in further view of Ohta in further view of McCormack.

As per claim 14, this claim is similar in scope to claims 5 and 13, respectively, and is rejected under the same rationale.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey, Hill, Ohta, and McCormack in order to achieve more accurate color differences between regular colors and colors using a transparency component as well. This ability to handle transparency colors with dissimilarity calculations makes the system more flexible to use with a wider variety of color pixels and formatting.

Response to Arguments

1. Applicant's arguments filed 6/8/2007 have been fully considered but they are not persuasive.

Applicant argues "Since Betrisey does not smooth out the composite image through the filtering unit, it does not display a smoothed out composite image" (bottom of page 15 in filed response). The examiner respectfully maintains that the rejections are proper because the reference of Hill is primarily relied upon for teaching the filtering process. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues Hill does not does not disclose "a filtering unit operable to smooth out color values of second-target-range sub-pixels of the composite image that correspond to the first-target-range sub-pixels, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target-range sub-pixels." (middle of page 16 in filed response). The examiner respectfully maintains that the rejections are proper because the front image and composite image of Betrisey *(col 12, lines 9-10, "Portions of a character within a character outline* ***represent foreground image areas****" and col 27, lines 59-64, "****The term compositing is used to refer to a color blending operation*** *which involves the use of a background image to supply the background color luminous intensity values used in the blending operation. In step 2404, foreground and background colors are applied")* can be used in conjunction with the

filtering unit of Hill *(col 19, lines 4-10, "**adjusting the luminous intensity of pixel sub-components** of distracting pixels may involve (1) subtracting some luminous intensity from bright pixel sub-components and/or (2) adding some luminous intensity" where adjusting the luminance is filtering)*, to teach or suggest all the claimed limitations. Further, it would have been obvious to establish a correspondence between pixel locations for the foreground and composite images in order to simplify the implementation of the system and to simplify the pixel addressing to a given location in the images.

Applicant further argues Hill does not modify a different pixel such as a pixel in a composite image nor does it modify a different pixel based on a dissimilarity from the target pixel (towards bottom of page 16 in filed response).

The examiner respectfully maintains that the rejections are proper because Hill teaches of comparing pixels *(col 19, lines 44-46, "**A red/green difference intensity value is determined** and compared to a threshold value")* where this analysis can include adjacent or neighboring pixels *(col 19, lines 7-10, "(2) adding some luminous intensity, e.g., the amount that was subtracted in (1), to an adjacent, different colored pixel sub-component, e.g., a neighboring pixel sub-component of the same pixel")*. Further, Hill refers to the use filtering by taking into account the front image in order to filter the composite image by *(col 19, line 65 – col 20, line 5, "**Color processing and adjustment is performed**, as required, by the sub-routine 813 on a per pixel processing basis ... **wherein information identifying the foreground and background colors to be used** ... This may involve accessing color information stored by the operating system")*. In this instance, color processing and adjustment is part of the filtering process. Since both

background and foreground colors are accessed and used the color filtering process is performed on the composite image taking into account color adjustments on the front image in the combination.

Applicant argues Since Hill does not smooth out the composite image through the filtering unit, it does not display a smoothed out composite image. (top of page 17 in filed response).
The examiner respectfully maintains that the rejections are proper because the filtering system of Hill can be incorporated into Betrisey. Betrisey already has a composite image *(col 27, lines 59-64, "**The term compositing is used to refer to a color blending operation** ... In step 2404, foreground and background colors are applied").* Hill performs image filtering or image smoothing *(col 19, lines 4-10, "adjusting the luminous intensity of pixel sub-components of distracting pixels").* Based upon the combination of references of Betrisey and Hill, the claimed limitations are all taught or suggested, and further the combination would have been obvious to one of ordinary skill in the art.

Applicant argues Even if Hill were used for its filtering process, there is no indication in Betrisey or Hill that the dissimilarity level should be taken from the front image and the changes be done on the composite image to prevent image degradation (upper middle of page 17 in filed response).

The examiner respectfully maintains that the rejections are proper because actual limitation of image degradation is not explicitly claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the

features upon which applicant relies (i.e., "preventing image degradation") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, the examiner acknowledges that applicant's invention uses image degradation however, some details of the process (i.e. on page 46, lines 19-27) in the specification are absent or not explicitly recited in the claim language.

Applicant argues with respect to Claim 2, neither Betrisey nor Hill discloses "the calculation unit calculates a temporary dissimilarity level for each combination of the first-target-range subpixels, from color values of the first-target-range sub-pixels, and regards a largest temporary dissimilarity level among results of the calculation to be the dissimilarity level." (middle of page 19 in filed response).

The examiner respectfully maintains that the rejections are proper because the reference of Hill shows the claimed subject matter in col 20, lines 50-56, "if the called sub-routine determines that one or more of the luminance intensity values of the CURRENT PIXEL's pixel sub-components should be changed to reduce or eliminate distracting color distortions, e.g., artifacts, one or more of the luminance intensity values of the CURRENT PIXEL's pixel sub-components return from the sub-routine with an adjusted value". In this instance, the color distortions can be created due to large color differences (a large dissimilarity level of color values). To discover these distortions, the largest color differences would have to be identified though processing the pixel data. In addition, the distortion is greatly reduced by readjusting the color value for a large color

difference will reduce the distortion, and thus a large difference can be first calculated before the system knows where the make a color adjustment.

Applicant's remaining arguments with respect to the claims have also been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel F. Hajnik whose telephone number is (571) 272-7642. The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka J. Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

D. H.

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER